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MERRICK'S REPORT ON GAS MANUFACTORIES.

Report, upon an examination of some of the Gas Manufactories in Great Britain, France, and Belgium, under a resolution passed by the Select and Common Council of the City of Philadelphia, January 2d, 1834, authorizing the Gas Committee to engage a competent person to proceed to Europe for the purpose of examining Gas Works, with a view of obtaining the best information as to the construction of works, the manner of manufacturing Gas, and in general make such observations as may be useful, in the event of Councils determining to adopt a plan for lighting the city with Gas.—By S. V. Merrick.

To the Select and Common Councils of the City of Philadelphia.

Gentlemen:—

In pursuance of a resolution of your body, passed on the 2d of January, 1834, and of instructions from the Committee charged with an inquiry into the expediency of lighting the city with gas, received on the 18th of March last, the undersigned immediately embarked on his destined mission, and during the course of the passed summer has made a careful examination into the various plans and processes, employed in manufacturing carburetted hydrogen gas, for private and public illumination, now in use in the principal establishments of Great Britain, as well as a cursory view of the works in Paris, Brussels and Ghent.

In conducting these investigations, I have to acknowledge the friendly reception I met with from gentlemen connected with gas manufactories, either as engineers or managers, in most places which came under examination, to whose liberality I am indebted in general for opportunities granted for a free inspection of their works, and in many cases for the entire confidence with which their modes of operation and results were communicated.

The gas works which I visited on the continent, being all of English origin, and under English control, I was unable to obtain from them any information of material value, not already derived from original sources which had been brought under previous notice. In the course of this communication, therefore, my observations will be confined to comparisons between systems used in England or Scotland, believing that the purposes of the mission will be fully attained by such comparisons as may there be made.

In preparing this report, I have deemed it my duty, upon reviewing the instructions, rather to take a general view of the arrangements and machinery best adapted to the wants of the city, and to point out the system which appears most conducive to its interests, than at this late day to enter into any laboured argument, to prove the general expediency of a measure, which has received the sanction of so many years experience.

Arriving in a country, the capital of which consumed during the past year, a quantity of gas, equivalent in illuminating power to nearly forty million pounds of candles, which possesses within its limits and populous suburbs, forty-seven stations for making and storing gas, erected by twelve different companies, who have in their construction profitably invested an aggregate capital of near eleven millions of dollars, and whose arrangements are not now sufficient to supply the growing demand, it appeared too late to inquire, whether gas as a means of illumination, was preferable to any other substance.

If I add to this, the universal testimony of the citizens of that metropolis, and of high public functionaries, as to the moral effect experienced by the facility of producing, at a moderate expense, a brilliant light in the streets and narrow passages, with which that city abounds, adding to the safety, comfort, and convenience of society, it will not be expected that much time will be occupied in demonstrating what is thus forced upon our attention.

If other evidence is wanting to prove the consideration, in which this system is held in Great Britain, I may instance the fact, that during five months travelling in that country, I scarce ever passed a town or village to which the material was accessible, that was not provided with this indispensable means of obtaining light, or was in preparation for it;—and so great has been the extension during the past year, that all the foundries which came under my notice were full of contracts for the delivery of pipes and retorts.

As far as I have been enabled to collect the history of these small works, they have generally been erected by the owners of real estate, as an improvement to their property; and when completed, leased to any individual who would keep them in repair, and pay the best interest on the cost.

Believing as I do, that the formidable objections, raised when this subject came under discussion during the past year, were entirely refuted by the Report of the Committee, who examined into their truth, and being confirmed in the opinion as to the correctness of the statements made by that committee, it is sufficient to refer to that document, in case such evidence should now be deemed requisite.*

In considering the kind of gas works best suited to the wants of Philadelphia, it will be necessary to take a general view of the systems now practised in Great Britain, the materials employed and the mode of constructing the apparatus for distillation, giving a comparison of the advantages of each plan.

As regards the materials which may be used in the manufacture of gas, to the best advantage, enough has been said in the report of the committee, made to Councils in March, 1832, who carefully investigated this part of the subject, to show how much will be gained by the use of bituminous coal, in stead of the more costly material heretofore partially adopted in this country and in Europe:—and I deem it an argument of no small moment in favour of this mode of lighting, that every material used in the fabrication of gas, will be the product of Pennsylvania labour. The bituminous coal from which it is to be made, may be drawn from the rich mines now open in the interior of this state; the fuel from the exhaustless beds of anthracite, and the lime for purifaction, from our own vicinity;—and not a lamp will shed its rays over our streets, which has not paid a tribute to the internal improvements of the state.

If any evidence be required in confirmation of their

* See Register Vol. XIV. page 414.

opinion, it is to be found in the fact, that the use of oil as a material for the production of gas, has long since been abandoned in both countries, and the works used for making rosin gas; even this material has failed to make a successful competition against the cheaper substance, having finally given way after a long struggle.

The rosin gas works of Great Britain, have been, or are about to be converted, at a heavy expense, into coal gas works, and in New York the company who are now erecting their works for supplying the upper part of the city, have been compelled in part to change their plan, and adapt them to the use of both materials.

Believing, therefore, that coal in great abundance and of good quality, may be had for the supply of the works, my attention will be confined to it as a gas making material, and to the plans now in use for its manufacture.

The coals used in Great Britain for this purpose, are various in their properties and values, but for our present purpose may be divided into two general classes, viz. the Cannel or the Parrot coal of Scotland; and the soft or bituminous coal, more abundant in England.

The former of these ranks the highest for the purpose, containing a larger proportion of carbon and volatile matters, with less bitumen than the soft coal; producing a gas highly charged with olefiant gas, and possessing an illuminating power superior to any other known in the kingdom.

This material is in use in Manchester, Stockport, and some other towns in England, and almost universally in Scotland, yielding gas, having a specific gravity varying from 550 to 650, being nearly equal to rosin gas.

The coke from this coal is of but little value in comparison with that produced from the soft coal, being of less bulk than the material from which it is made, and furnishing but a small quantity for sale, after deducting that required for fuel to heat the retorts.

From this material, therefore, but little profit is derived from any product except the gas; but the superior quality of that gas, in connection with the low price of the material, warrants its use in those works which have adopted it, and the proprietors have been compelled to pay undivided attention to increase the quantity of gas, without reference to profit from the residuums.

As in America there is no coal yet discovered bearing any resemblance to this material, it would be useless to dwell here upon the systems used in its carbonization, except as showing the experience of several works, having used precisely the same material, on different systems, and in apparatus varying in construction from each other, but bearing a comparison with those used for the carbonization of the fat or soft coals.

I shall advert, therefore, to the Cannel coal works, after treating of the plans adopted in England for the carbonization of the soft coal, among which the Newcastle, yielding about thirty five per cent. of volatile matters, seems to stand pre-eminent in reputation, producing in the usual mode of operating, from ten to twelve thousand feet of gas per chaldron. Specific gravity, from 4.10 to 4.30.

It may be proper here to remark, that although the specific gravity of gas will not give precisely its value or power of illumination, still, as a general rule, the approximation is so near, that I adopt it as an indicator of the value of the gas, for want of a more accurate standard, which may be referred to in general terms.

The various proportions in which the component parts are found incorporated in the bituminous coals of Great Britain, yielding gas of different qualities, and more or less in quantity, and much to the difficulty of comparing the several systems of working with each other. The results of all comparisons must therefore be mere approximations, except where coal from the same mines affords the basis.

To seek, therefore, a series of works, in which the same coals were used, appeared to me essential for definite purposes, while I continued to confirm my results by observations elsewhere.

The coal I found in most general use, was that already alluded to, from Newcastle on Tyne, being preferred in London, and on the eastern and south coast of England, to any other within reach; and as some of these works varied in their modes of distillation, it became, for all practical purposes, a standard material by which to compare the respective operations of each, diminishing the difficulty of selecting a plan best adapted to our purpose.

The system upon which gas is to be made, at the least cost, first claims our attention, and resolves itself into three points.

1. The expense of fuel and material for carbonization.
2. The expense, in wear and tear of apparatus.
3. The labour attendant upon its manufacture.

This is a subject on which much diversity of opinion exists among gas engineers:—the plan of retort, the duration of the charge, and the temperature at which the process of carbonization is to be conducted with best advantage, are points of controversy among them at this day.

To describe all the plans would be quite useless. I shall therefore confine all observations to those which appear most deserving of merit, and necessary to our present purpose.

The first plan claiming attention is the oven of Mr. King, with which we are familiar at the coal gas works of America. The dimension being five and a half feet wide by six feet long, eighteen inches high at the crown of the arch, and twelve inches at the spring, carbonizing about ten bushels of coal at a heat, or a ton in twenty-four hours.

These ovens are made of thick boiler iron, firmly rivetted together, with the bottom of the same material, set in an arch of brick work, heated by one fire, the bottom being shielded with fire tiles, to protect it from the direct action of the flame, with longitudinal flues under it; the draft, passing over the top of the oven, makes its exit in the crown near the front. Some ovens of this description are in use in Liverpool, with cast iron bottoms, but their value has not been determined on by practice. This plan of carbonization I found nowhere in extensive use, except at the Liverpool works, constructed by the inventor.

Of the cast iron retort, there are many modifications, varying in dimension and shape with the caprice of the constructor, and in many cases without any definite idea of the principle to be aimed at.

They may be divided into three general classes:

1st. The circular retort, from twelve to twenty inches in diameter, and from six to nine feet in length. This retort is used in Manchester, and same other places, in general for the distillation of Cannel, or Scotch Parrot coal. It answers for the distillation of a coal which retains its form in lumps, and is advantageous only from the facility with which its position is changed, when partially destroyed by the action of fire on the under side.

2d. The small or London D retort, so called, in consequence of its having first been used by the chartered company in London, being still in use at their works, and recommended by their engineer. This retort is twelve inches broad on the base, eleven inches high, and seven feet long, carbonizing one and a half to two bushels at a charge.

3d. The York D retort, (so called, in consequence of its having been introduced by Mr. Outhit, of York,) and the modifications of it, among which I should include the elliptic retort, as having the same general purpose in view. The difference between the London

and York D retorts, consists only in an extension of surface upon which the coal is spread, the latter varying from eighteen to thirty inches in width, and about the same dimensions in length and height.

These cast-iron retorts are set in benches of from two to nine in a set, usually enclosed in an arch of brick work, heated with one or two fires, arranged with shielding tiles, so as to prevent a direct action of the flame upon the metal. Some with ascending, some with descending flues.

To describe the particular mode of setting on each plan, would require drawings in detail; a labour entirely uncalled for, as the proper plans will be prepared of the arrangement deemed most effectual.

In addition to these, I have found retorts, or ovens, composed of fire brick, built in form, or of clay moulded to the shape in the arch constructed to receive it, varying in dimension and shape from two to four or five feet in width, which will be treated of in the sequel.

The plan of retort, and the system of working to produce the greatest quantity of gas, of the best quality, is at present a subject of controversy among engineers; and to form a just opinion, requires a careful comparison of the operations of each.

As the whole economy of gas making depends upon the expense of carbonization, it was an object of much solicitude to obtain from the books at the respective works, such statements of their daily operations, as would enable me to form a correct estimate of their advantages, rejecting mere theoretic opinions and verbal statements, if unaccompanied by satisfactory testimony.

In giving the general result of these examinations, it will not be requisite to record the names of the works, as such a publication would be a betrayal of confidence, highly unjustifiable.

These statements have been generally obtained for a short period of time, to avoid multiplicity of figures; but have been compared with the workings for much longer periods, often six and twelve months: the results may, I think, be received with confidence.

The following have been taken as the elements of comparison:

1st. The quantity of coal used for carbonization and fuel.

2d. The product of coke in weight.

3d. The product of gas, and quality.

By deducting the second from the first, we shall have the nett amount of material consumed to produce the third element, or product of gas, in cubic feet, its quality being considered generally.

This mode of comparison has been preferred to the more usual estimate of ascertaining the proportion of fuel used, to the coal carbonized; because the latter method is liable to error, as the quantity and quality of the gas is improved by adding to the temperature at which the distillation is carried on, and consequently increasing the amount of fuel burnt.

In this comparative view, all residuums, save the coke, are rejected; not because they are worthless, but on account of the great difficulty in obtaining a correct statement of the quantity made, and variation in value of the other residual matters.

The vast quantity of tar and ammoniacal liquor, made in Great Britain, has rendered them so far unsaleable, that the latter is often evaporated under the retorts or flues, and the former accounted of more value, as a fuel for heating retorts, than as a marketable product. Such residual matters, therefore, in a comparative statement, do not constitute an item of sufficient importance to affect the result in an appreciable degree, though some difference must exist in the quantity of tar made, when very high degrees of heat are used in the carbonizing process.

The system of carbonization which has longest obtained, and which at the present day is in most general use, is to fill the retorts with coal, leaving space for the increased bulk of the coke, and for the insertion of tools for its removal, carbonizing with a moderate heat, and allowing the charge to remain exposed to the action of the fire for six or eight hours.

The opposite to this, is to charge the retorts with less coal, or a thinner strata, and to increase the temperature, so as to work off all the gas contained in the charge in three, or at most, four hours.

By the first mode of operating, less fuel is required to carbonize the same weight of coal, and the retorts being subjected to more moderate heat, will remain fit for service a longer period of time. It is therefore contended by its advocates, that the saving of fuel and saving in retorts, more than compensates for any advantages to be obtained by the short charge system.

The opposite doctrine is not new, having been held and practised in the early stages of the art, under many practical disadvantages; but the more easy operations on the long charge system, have been practised in a majority of the works using the bituminous or soft coal.

The attention of several skilful engineers has of late been directed to an improvement in the quality, and increase in quantity, of gas produced, which they have effected, in a material degree, by operating with high temperatures and a thin strata of coal.

Their practice has been founded upon the following theory:

That the first products from the distillation of coal, after the water has been evaporated, contains the greatest quantity of olefiant gas, and consequently has the highest illuminating power.

That if this gas be evolved at a high temperature, it carries with it, in combination, a portion of carbon, which, at a low temperature, would not be disengaged as gas, but would pass over as tar.

That, as the process advances, the proportion of carbon evolved diminishes; while the proportion of sulphur increases.

That after the first two hours, the quantity of gas and its specific gravity diminishes in a rapid grade.

To test the accuracy of this theory, certain experiments were instituted, intended to ascertain the quantity and quality of the gas evolved during different periods of its distillation, varying the quantity charged at each time, the temperature at which it was carbonized, and the duration of the process, so as to embrace a fair comparison of the two modes of working.

The first experiment was made with two York D retorts, twenty-two inches broad by seven feet long, charged with two hundred pounds each of Lambton's Primrose (New Castle) coal, heat kept up to a fair red, and continued for nine hours. The result was, that the production of gas, from four hundred pounds of coal, (five bushels) amounted to sixteen hundred and twenty feet, or less than eleven thousand feet per chaldron; that four-fifths of this quantity was evolved during the first six hours, and more than half evolved during the first four hours. Specific gravity 4.5.

The next experiment, made with the same retorts, heated to a higher temperature, charged with one hundred and forty pounds each, and worked off in six hours. The gas produced from this charge of two hundred and eighty pounds, was seventeen hundred and fifty feet, or in the ratio of eighteen thousand feet of gas per chaldron: six sevenths of the whole product being evolved in four hours. Specific gravity 5.18.

The charge being then reduced to one hundred and twenty pounds to each retort, or two hundred and forty pounds total, was worked off in five and a half hours, producing the same ratio of gas to the chaldron — Eleven-twelfths of the whole product being evolved in four hours; the product in gas, evolved after the four hours, not being worth the fuel taken to produce it.

By carefully repeating these experiments, and taking the specific gravity at various stages of the process, it was found to decrease in each successive half hour, as the work progressed, after the second or third trial; while the result, as respected quantity, proved equally in favour of the short charge system.

The result of these experiments clearly establishes the fact, that the greatest quantity of gas, and the best in quality, may be produced by working a diminished quantity of coal in the recipient at a high heat.

So far, therefore, as quality and quantity of gas produced are concerned, the principles to be followed are,

1st. An extended surface, and thin strata of coal in the retort.

2d. Rapid carbonization, at a high temperature.

From the insulated experiments, such as have been detailed, no judgment can be formed on the other points of comparison; although care was taken to note the quantity of fuel used in each experiment, the correctness of the statement cannot be assumed as a guide to continuous work.

To determine the expense of fuel, required under different circumstances, recourse must be had to the continuous operations of works using the same material for carbonization, and dividing the amount of fuel into the product of gas made, instead of the quantity of coal carbonized; for this mode of estimation the reasons have been given.

The statements now presented are from works carbonizing New Castle coal, at four and six hour charges. As I could obtain no returns from works using the same coal at eight hour charges, the comparisons will be confined to the two first, which are sufficient for our purpose.

Station No. 1. London D retorts, area of surface seven and half feet, set two to one fire; the lower retort cased in tiles, and the return flue passing under the top retort, unprotected; the whole covered with a fire brick arch, charged every four hours with one bushel, or 80 lbs. coal.

Whole amount of coal, used for fuel and carbonization, in pounds,	154,800
Deduct coke made,	59,166
Total material consumed,	95,636 pounds

to produce 551,387 feet of gas, or to each pound 5.75. Specific gravity 4.8.

Station No. 2. Retorts and setting the same as No. 1, area seven and half feet, charged every six hours with one and a quarter bushels, or 100 lbs. coal.—

Whole amount of coal for fuel and carbonization, in pounds,	69,520
Less coke made,	22,433
	47,087 pounds

to produce 222,600 feet of gas, or to each pound 4.6 feet. Specific gravity 4.4.

Station No. 3. York D retorts, setting the same as before, area of surface twelve and half feet, charged once in four and half hours, one and quarter bushel of coal.

Whole amount of coal used for fuel and carbonization, in pounds,	25,360
Deduct coke made,	8,700
Total material used,	16,660 pounds

to produce 91,550 feet of gas, or to each pound 5.40 feet. Specific gravity 4.70.

Station No. 4. Elliptic retorts, area of transverse section eight feet and one-sixth, set seven in a bench, shielded from the action of the flame by fire lumps, covered with a brick arch, charged with two bushels, or one hundred and sixty pounds, every six hours.

Whole amount used for fuel and carbonization, in pounds,	105,720
Deduct weight of coke,	43,680
Total material used,	62,040 pounds

to produce 308,000 feet of gas, or to each pound 4.8 feet. Specific gravity 4.33.

Station No. 5. York D retort, set same as No. 1, area of surface thirteen feet, charged every four hours with one bushel and a half of coal.

Total coal consumed for fuel and for carbonization, in pounds,	23,600
Deduct coke made,	9,240
Total material consumed,	14,360 pounds

to produce 92,500 feet of gas, or to each pound 6.44 feet. Specific gravity 5.10.

It will be here seen, that the result of the comparison between the two systems, as illustrated in these five statements, is as follows:

No. 1.	London D,	4 hour	charges,	5.75 feet to pound.
" 2.	do.	6 hour	do	4.60 do
" 3.	York D,	4½ hour	do	5.40 do
" 4.	Elliptic,	6 hour	do	4.80 do
" 5.	York D,	4 hour	do	6.44 do

The quantity of gas produced from a pound of material used, and the quality, as indicated by the specific gravity, invariably gives the advantage to the short charge system.

It should be observed, that the coke produced upon this system, is lighter than by the old plan, and the bulk increased.

These points being established, we are next to compare the economy of the plans respectively taking into view the wear and tear, and the labour required to keep up the supply.

It does not necessarily follow that an increased temperature will create a corresponding increase of wear in the retort, as variable heats have a much greater effect upon them than high heats, if they are kept uniform. The results are not so disastrous upon the retorts used in the short charge system, as might be supposed, provided care is taken to keep the temperature the same; but the difficulty of keeping high heats equable, exposes the retorts worked on this system, to greater risks than by the opposite plan:—to determine, therefore, what will be the duration of them, is difficult, as experince on a large scale has not yet been had to settle this point; although in small works, whose operations have been brought immediately under the eye of the engineer, but little difference in duration has been found between the two plans Still it would not be wise to draw from their experience conclusions, and refer them to works on a larger scale, which must be entrusted to a greater number of stokers and which cannot be kept so completely under control. In Great Britain, the proportion of gas required during the summer months is so small in comparison to the other parts of the year, that during this period a great majority of the retorts are thrown out of service, consequently in a set of retorts, the usual duration of which is eight months, a sufficient number will be saved to do the work of the other four or summer months; for, except in large cities, the public lighting is entirely suspended during that term, and the private lighting diminished in a great degree.

In a work, therefore, in which the retorts can stand eight months active service, they will require renewal annually to keep the stock whole. In works operating with six hour charges, I have found a better average duration than here stated, and that two complete renewals in three years, being equal to working twelve continuous months may in general be calculated on.

This duration is more than many works attain, and may be considered the highest average that can probably be allotted to them.

Retorts working eight hour charges, often remain in continuous service eighteen or twenty-four months; indeed I have known them thirty. No economy is derived from such long use, because, although the retort will not leak, the product is constantly diminishing, while the proportion of fuel increases from the contracted space in the retort occasioned by the solid particles

of carbon which collect on its internal surface. Indeed this obstruction takes place shortly after the working commences, and the incrustation increases so fast that it is doubtful whether there is much saving effected by retaining a retort in service past one season.

But it is needless to go into minute calculation upon this point. If we lay aside the retorts working eight hours, and form the comparison between those working four and six hour charges we shall find that the additional duration of the last, is compensated for by the diminished number required to do the same work on the first plan, on account of the rapidity of the working, and the additional gas produced from the same material, leaving the wear and tear about equal.

Thus to make 100,000 feet of gas, in twenty-four hours, by the six hour system, producing 11,000 feet to chaldron of New Castle coal, would require nine chaldron and four bushel.

Say 41 retorts each, 2 bushel to a charge, 4 charges in 24 hours.

41 + 2 + 4 = 328 bushels, at 11,000 feet per chaldron, 100,000 feet.

To make the same gas by the short charge system, at 15,000 feet to chaldron, would require 6 chaldron, 24 bushels coal; say 27 retorts, one and a half bushel to a charge, 6 charges in 24 hours.

27 + 1½ + 6 = 243 bushels, at 15,000 feet per chaldron, 101, 245 feet.

Thus the number of retorts required to produce the same quantity of gas, bear the relation of 41 to 27.

Now if the retorts, on the six hour plan, require renewing twice in three years, there will be required, for that period 41 + 2 = 82 retorts. While on the other system, lasting but one year, there will be required, 27 + 3, or 81 retorts.

Thus, not withstanding the duration of the retorts upon the four hour plan, is less than upon the other, when the expense of renewal is divided upon the quantity of gas made during an extended period of time, the difference is unappreciable; while the former possesses the advantage of requiring less space, and less capital in the original construction of the works.

From this statement, it is evident that, as the labour must bear a proportion to the number of retorts at work, and the quantity of material to be handled, the advantage is decidedly in favour of the last named plan.

In these remarks, reference has been had to cast iron retorts only; but so far as the amount of production is considered, they refer equally to the oven of Mr. King.

These ovens, it has been observed, are made of malleable iron, and in point of economy in wear and tear, have a decided advantage over the cast iron retort, for the work they are capable of, requiring less fuel than many other works.

I should be much inclined to adopt them in preference to the cast iron, were it possible to work them on the short system.

The shape of these ovens is such, as to carry out the principle laid down to the fullest extent, but the extended surface of the bottom renders it impossible to heat them to the requisite temperature, without early destruction to their shape, and soon rendering them unfit for useful service; but I am not at all certain that the adoption of wrought iron retorts, of smaller dimensions, would not be conducive of advantage.

The high price of iron, in this country, led me to examine with care into the plans in use, and experiments now making in England and Scotland, to carbonize in retorts or ovens made of fire-clay or brick.

The original inventor of these ovens, was I believe, Mr. Grafton, of Cambridge; and one work in Brighton, now operates with them successfully. The manager of the station spoke of them favourably; but I could not obtain an exact statement of his operation; nor could I hear the same good opinion expressed elsewhere, though many had tried them. At one station, I found two of his ovens in operation, which required as much coal for fuel as for carbonization; but this was accounted for in the thickness of the walls, which had been built of nine-inch brick.

Independently of the high per centage of fuel, required by the ovens of this material, other difficulties occurred in the use of them which almost proved fatal.

In the first place, it was found that the clay, unless made very thick, was a material of too little tenacity to resist any undue pressure; especially where the separate pieces were joined together by cement; and that any accident, occasioning a stoppage of gas in the pipes, reacted so violently as to burst or injure the retort.

This difficulty was remedied by building stays or ties into the retort, connected with the outer arch. But the evil most difficult to be cured, was the tendency to leak at the junction of the cast iron mouth piece, and at the joints, owing to the contraction and expansion of the material under different temperatures.

When the retorts are first brought to their heat, time will elapse before the cement in the joints attains the consistency of the other material, and becomes entirely gas-tight; but while the temperature is kept uniform, little difficulty is experienced when once they have been made tight.

The constant variation in demand for gas, makes it incumbent on the manufacturer to vary the number of retorts in action, as it increases or decreases. Hence the necessity of letting down the retorts; an operation during which the joints, being the weakest part, give way as the brick contracts; and it is more difficult to refill these cracks than to make the original joints with fresh brick and cement. This difficulty has been partially overcome by filling the joints, before reheating, with clay cement, and washing them with a mixture of salt and pot-ash, or some other glaze.

To produce a perfect retort of clay, the only desideratum wanting, is such a combination of material as will not be subject to change of dimension, from any change in the temperature, so that the fires may be let down and re-kindled without causing a waste of gas.

To this end, Mr. Spinney of Cheltenham, an engineer of practical knowledge and skill in his profession, has instituted a vast number of experiments, and succeeded by a mixture of fire-clay, pipe-clay, and silex, in producing the desired results.

The Cheltenham works, under the charge of that gentleman, are provided with retorts or ovens of this description entirely; and the operations of that company are conducted in a manner highly beneficial to those interested, and to the public.

Heretofore, single ovens, of a dimension smaller than Grafton's, have been used by him, each heated by one fire, and while the quantity of gas from the coal carbonized, is quite as much as would be produced by the same system of working in iron retorts, the fuel account is materially increased—the great saving being in the wear and tear, an item reduced to a very limited amount.

In some new benches erected, Mr. Spinney has reduced the size of the retort still more, and set two to one fire, carrying on the carbonization at a lower rate than with the single oven; but this bench has not been in operation long enough to decide whether the saving in wear is not more than compensated by increase of fuel; though, as far as a judgment could be formed, the result was satisfactory.

It should be observed, that these works were operating with eight hour charges, and therefore not obtaing all the advantage which might accrue from using an indestructible material.

I am inclined to think, however, that the clay retorts will be found a valuable acquisition to the gas maker in this country, and am confirmed in this opinion after examining the works of Scotland, in two of which

the clay retorts are in constant use, with highly beneficial results. Here, as well as in England, immense difficulties have been encountered in bringing them to perfection; but their efforts have been crowned with success.

At the work in Glasgow, a fair example is offered of the value of this material, in comparison with iron retorts, in both of which the same species of coal is carbonized.

The principles laid down, of working at high temperatures, are here carried to a greater extent than in any work in England, seven or eight charges being worked off in twenty-four hours, each retort being made to produce near five thousand feet of gas in that period.

To enable iron to stand such excessive heats at all, it is necessary to shield them at all points with fire lumps, rendering them as inaccessible to the action of the fire as if they were composed entirely of clay. The result is in this case, that the fuel account is quite as high as with the clay, while the wear and tear is ten to one in favour of the latter material; for with their utmost care, it is difficult to preserve the iron retorts more than four months, while the clay lasts from twenty-four to thirty months, and costs far less in construction.

The difficulty which exists in the iron retorts of contracting internally, in consequence of the deposite of carbon, has here been remedied in the clay retorts, by occasionally leaving the interior in contact with the action of the atmosphere a few hours, while at a red heat, the oxygen of which combining with the carbon, separates it from the clay surface.

In the work alluded to the most decided preference is given to the clay retorts, where, as well as at the Paisley work, which operates with brick retorts on the same principles, the quantity of gas procured from a pound of coal is ten or twelve per cent. greater than in those works using the same material, where milder heats, incident to the use of cast iron, are in practice

Although from a careful examination of this subject, I feel persuaded that the use of fire clay-retorts will be found more conducive to economy than those made from any other material in this country, (where the price of iron is more than double its price in Great Britain, and that in the event it will be resorted to,) yet I am by no means prepared to recommend its immediate adoption.

We have no reason to suppose that our skill will enable us to bring to perfection, at once, a material which has cost so much labour and loss to experienced engineers, who have for years been endeavouring to bring it into successful operation, and who have not yet brought it to that state of perfection of which it is evidently susceptible.

The immediate success of an infant gas manufactory depends so much upon the first impressions with which it is received by the public, that it would be unwise to abide any risk of failure, by stepping out of the beaten track at the commencement, and I should by no means recommend any change from plans already known, and well tried.

It will be ample time to make experiments for the improvement of the process and apparatus, when experience has made us masters of the business.

I have therefore selected as the most suitable for the purpose, the retort described as the York D, of cast iron, set in such manner, with three to a fire, as will allow of the substitution of the clay retort, whenever such a change in the system of operating is deemed advisable.

This retort has been selected, because, under all circumstances, it appears to be the one with which the principles laid down may be carried out with the best advantage, being large enough to give them free scope, and least likely to become distorted by the high heats to which it may be subjected in the process of carbonization.

(To be continued.)

From Moore's Philadelphia Price Current.

PHILADELPHIA IMPORTS—FOREIGN AND COASTWISE,

FOR THE YEAR ENDING DECEMBER 31, 1834.

1834.	Lead.	N. O. SUGAR.			Sugar.	Cotton.	P. RICO SUGAR.		W. I. SUGAR. St. Croix, St. Thomas, and Cuba.			COFFEE.			MOLASSES.		
	pigs.	hhds.	tier.	bbls.	boxes.	bales.	hhds.	tier.	bbls.	hhds.	tier.	bbls.	bags.	tier.	bbls.	hhds.	tier.	bbls.
January,	960	80		2	304	40	233		108	12			1248			132		41
February,		388		10	158	812	510		146	513			16,768			1563	47	1089
March,	700	1045		17	610	740	510		145	335	7		8562			1060	100	53
April,	1589	3054		1	1252	687	517		656	1070	2		7900			1085	134	10
May,	1788	916			601	870	466	11	329	306	1		6544	20	15	533		
June,	1216				1051		729	13	238	287			7568	3	126	469	5	225
July,	7399	803		32	1766	4072	1467	26	109	510			5955	6		1447	64	86
August,	6201	782		16	1681	3144	389			22			7388	40		942	123	623
September,	4847	744		137	1045	1592				72			4618	20		918	21	969
October,	4970	120			724	1345	50		355	20			10,403	24	70	367	57	506
November,	3811	31	4		1382	1729	127			87			16,189	50	63	950	6	233
December,	4174	910			1174	1943	97						5726	32	22	567	27	
Total,	37,955	8,873	4	215	11,748	16,974	4,585	50	2,076	3,234	10	918	98,869	195	452	9,934	584	3,835

From Moore's Philadelphia Price Current.

EXPORTS OF COTTON AND TOBACCO,

FROM THE

PORT OF PHILADELPHIA TO FOREIGN PORTS.

FROM THE 30th SEPTEMBER, 1833, TO THE 30th SEPTEMBER, 1834.

	Cotton.	Value.	Tobacco in hhds.	Value.	Tobacco in bales.	Value.	Manufactured Tobacco & Snuff.	Value.	Tobacco Stems.
Fourth quarter, 1833.....	86,929 lbs.	$15,083	134	$10,794	429	$3,268	17,452 lbs.	$3,150	
First quarter, 1834.....	171,802 lbs.	21,056	197	18,366	100	557	6,892 lbs.	404	
Second do. do..... ...	18,267 lbs.	2,374	336	25,476	50	396	51,106 lbs.	4,016	
Third do. do.....	334,071 lbs.	45,091	65	6,687	503	1,946	31,055 lbs.	5,822	$1,400
	611,069 lbs.	$83,604	732	$61,323	882	$6,167	126,505 lbs.	$13,392	$1,400

NEW FERRY STEMBOAT.—The Camden and Amboy Rail Road Company have had built a steamboat for conveying passengers across the Delaware, which is designed to fore itself through the ice. The bows of the boat are solid and covered with iron, and so constructed that it may be forced upon and by its weight break in the ice. The length of the keel is 90 feet, the breadth of beam 40 feet, and she is provided with a very powerful engine which has a 9 foot stroke, also with a spacious and convenient cabin. Her wheels and paddles are made very strong and protected by iron coverings from injury by the ice. We understand she came round from New York, where she was built, to this city, in 22 hours.

RIVER DELAWARE.

(Continued from page 8.)

MR. DOUGLASS' REPORT.

PRINCETON, Nov. 18th, 1834.

To Garret D. Wall, Peter J. Stryker, and John M. Sherrerd, Esquires, Commissioners of the State of New Jersey, &c.

Gentlemen:—In compliance with your instructions, I have made an examination of the Delaware river, with a view of ascertaining the best place to form a connection between the Pennsylvania canal and the Delaware and Raritan canal feeder—also the best mode of obtaining a supply of water for the use of the Pennsylvania canal, with the least injury to the navigation.

Black's Eddy appears to combine more advantages, and offers more facilities for forming such a connection, than any other place. The eddy is caused by a projection of the main land from the Pennsylvania shore, contracting the river into quite a narrow space. The sudden widening out of the river below this point, creates a counter current, so that boats and rafts incline towards the Pennsylvania shore, and find no difficulty in landing at any stage of the river. Immediately below the eddy, the river takes a sudden turn to the east, forcing the current directly in to the head of Bull's Island, at the head of the feeder, so that boats or rafts, starting from the eddy drift, directly to the entrance of the feeder. The entrance to the feeder is about one mile below the eddy. The water from the eddy is of sufficient depth to float a vessel of six feet draft. If a connection is made at this place, it will be necessary to construct two locks of eight feet lift each, to get into the river from the Pennsylvania canal; also a tow path along the New Jersey shore, from opposite the eddy to the entrance to the feeder, which is all that will be necessary to form a safe and secure connection.

Another place which offers some facilities for a connection, is New Hope. In order to effect this, it will be necessary to connect the feeder with the river, by means of a short canal and lock of ten feet lift, and the Pennsylvania canal by a guard lock or lift lock. If by a guard lock, to insure a safe passage for the boats across the river, it will be necessary for them to run up the Pennsylvania shore some distance, before it will be safe for them to venture out into the current of the river, for fear of being drawn over the dam. The water along the shore for a distance of about one hundred feet from it, is quite shoal; consequently, it will be necessary to excavate a channel three feet deep below low water mark, so as to admit boats of the same draft as the Pennsylvania canal; a tow path along the river bank will also be required. The point to which this channel should be excavated, is about twenty-four chains above the guard lock at a place called Poplar Reef. From this point to the place proposed to connect with the feeder, there is sufficient depth of water to float any craft which can navigate the canals. I am apprehensive, if this plan should be adopted, the channel would be liable to be filled with a deposit from the river, and subject to receive damage in time of floods, and always be a source of perplexity and expense in keeping it in repair. Two plans have occurred to me, in which this difficulty can be avoided. The first is, by converting the present guard lock into a lift lock, dispense with one of the combined locks, and make a canal from the foot of the combined locks along the river bank to the above mentioned place, and lock down into the river by a lock of seven feet lift.

The second plan is, to lock into the river from the level above the combined locks, by two locks of seven feet lift each. In either of the above plans, I would propose to take the water in to supply the canal, through a sluice below the guard locks.

I do not think that a connection can be made with the Pennsylvania canal, without a stipulation to that ef-

fect. Even if it could be done, the Delaware and Raritan canal company would not be safe in being at the expense of making an out-let from their feeder, without an assurance that a connection would be kept open into the Pennsylvania canal.

To obtain a supply of water for the use of the Pennsylvania canal, at Wells' Falls, Mr. Gay proposes to extend the present wing dam upwards about two hundred feet, and construct a dam entirely across the river, TWO FEET HIGH ABOVE LOW WATER AT THE HEAD OF THE FALLS, leaving a sluice sixty feet wide and three hundred feet long, for the passage of the descending trade. The proposed location of the dam is about five hundred and fifty feet below the head of the falls: In that distance, there is a descent of 1.25 feet, which will made a dam 3.25 feet high. On examination, I found that extreme low water mark at the head of the falls, was 2.83 feet below the top water line in the Pennsylvania canal; consequently. they will want a dam of that height, above low water at the head of the falls, instead of two feet, as reported by Mr. Gay, which, added to the descent to the location of the dam, will give a dam four feet in height. At all events, I do not think that they can get a sufficient supply of water, with a dam of less height than 3.75.

My present opinion is that the descending navigation will be less liable to be injured if this dam should be constructed about two hundred feet nearer to the head of the falls, and make the sluice walls one hundred and fifty feet above and extend them five hundred feet below the dam, to prevent the boats and rafts descending the river from running on to some rocks which crowd both sides of the channel, and are partially covered with water when the river is at a navigable height. I would also recommend that some rocks be removed and the channel straightened below the dam.

My limited time would not allow me to make a thorough examination of Scudder's Falls; but I am of the opinion that the navigation of the river never can be restored or the channel kept open, so long as the work is in its present unfinished state. The bank forming the head of the Trenton water company's works terminates too near the head of the falls: it should be extended upwards at least three hundred feet, and raised so high that the floods cannot pass over it. It would be best to make a pier of timber crib work, filled with stone. The bank is now so low that the floods sweep over it, and is not protected by walls sufficient to prevent the earth, gravel and stones, from being carried into the channel. The sudden termination of this bank gives a check to the current, and gives it a direction diagonally across the channel. This might be counteracted in a measure by constructing a wing dam from the Pennsylvania shore to near the channel.

Estimated expenses of forming a connection at Black's Eddy:

Two lift locks, eight feet each,	$16,000
Excavating foundation and pumping,	3,500
Pier, slope wall and wharfing around locks,	2,000
	21,500
Tow path along the Jersey shore,	1,500
	$23,000

Estimate of the proposed works at Now Hope and Wells' Falls.

Locking down into the river from Pennsylvania canal, including the canal from the combined locks to Poplar Reef,	$17,400
Lock and canal to get into the feeder of Delaware and Raritan canal,	19,780
Dam and sluice walls,	15,300
Locks at Nieley's,	8,900
	$61,380

It will be observed that the difference between forming a connection at Black's Eddy and New Hope is fourteen thousand one hundred and eighty dollars; and the difference to the Delaware and Raritan canal company will be eighteen thousand two hundred and eighty dollars. Pennsylvania gains by the New Hope connection four thousand one hundred dollars. If the connection is made at Black's Eddy, the Delaware and Raritan canal company will receive the trade on eight miles more of their feeder, than if the connection is made at New Hope, which may be considered a low estimate at five thousand dollars per annnum.

There will also be twenty feet more lockage, and two miles more canal navigation by New Hope, than Black's Eddy.

Respectfully submitted, by your obedient servant,

(Signed,)

E. A. DOUGLASS, Engineer.

If there is to be any restriction as to the use of the water, (which I doubt the propriety of doing other than so far as not to obstruct the channel of the river,) I think it wouid be well to stipulate that each State can take and use the water for canal navigation, at any place above or between tide and State line.

—

COMMUNICATION FROM S. D. INGHAM, ESQ.

It is the interest of each State to retain the transportation as much as possible on her own canals, but those who have products to sell will seek the best market; when this happens to be at New York, produce at Easton will either pass through the Morris canal, or by unloading, leave the Delaware division of the Pennsylvania canal at Black's Eddy, opposite the head of the Delaware and Raritan feeder; or descend to Bristol, and thence by way of Bordentown to the Delaware and Raritan canal.

The expense of taking one ton of coal by these routes from Easton to New York will be respectively as follows:

By No. 1. From Easton to Newark, ninety and a half miles freight,	$1 23
Toll,	90½
Newark to New York,	25
	$2 38½
No. 2. From Easton to Black's eddy, twenty-five miles freight,	25
Toll,	12½
Boat,	3
Unloading,	10
Delaware and Raritan to New Brunswick, fifty seven miles toll,	48
Freight,	57
To New York, forty-five miles,	45
	$2 00½
No. 3. From Easton to Bristol, sixty miles freight,	60
Toll thirty cents, boat ditto eight cents,	38
Delaware river 10 miles,	10
Delaware and Rariran canal, forty miles freight,	43
Toll,	43
New Brunswick to New York, forty five miles,	45
	$2 39

The cheapest route will then be by Black's Eddy and Delaware and Raritan feeder: and the amount of toll received by Pennsylvania on it will be but fifteen and a half cents per ton: the question then presents at what other point can a connection be formed between

the two canals which will be more acceptable to Pennsylvania, and not objectionable to New Jersey.

Both canals lie within one lift of the water in the Delaware, immediately above the head of Wells' Falls, from thence downward the Delaware and Raritan rises above the water so rapidly as soon to require several locks to let down into the river; so it is in some degree with the Delaware division, and if a connection were formed below Wells' Falls, all the river boats which would incline to pass into either canal must pass the falls going to, and returning from, the point of entrance of the canals. An entrance at the head of these falls would avoid this danger and difficulty, and invite those boats into the canals, whose owners if they were obliged to pass the falls might find it their interest to keep on the river: a connection at a lower point would also be more objectionable to New Jersey. There is another reason for a connection at this point. The trade from the borders of the Delaware on both sides will seek the Philadelphia or New York market, as either may suit best, this trade concentrates at the two villages of New Hope and Lambertsville, and unless that from each place can get into the opposite canal by water connection, it will be charged with the expense of crossing the river by bridge or ferry.

There are also an abundant means for the supply of lime on the Pennsylvania side, which is greatly wanted on the route of the Delaware and Raritan canal. The expense of hauling lime across the river in waggons adds about twenty-five per cent to its cost at the Kilns.

With respect to the coal trade it should be observed that Philadelphia can be supplied rather cheaper from the Schuylkill than from the Lehigh, and the coal from the latter mines can be taken cheaper to New York than the former, hence the greater part of the coal from the Lehigh will be taken to the New York market, it will of course take the cheapest route, which as has been shown is that by Black's Eddy to the Delaware and Raritan feeder, now if it be supposed that two hundred and fifty thousand tons of coal go to New York, from the Lehigh, the difference to Pennsylvania, between its leaving her canal at Black's Eddy and at the head of Wells' Falls, will be as follows:

Two hundred and fifty thousand tons from Easton to Wells' Falls, thirty-six miles one half cent toll,		$45,000
Boat toll,		10,500
		$55,500
Toll from Easton to Black's Eddy, twenty-five miles, a half cent,	31,500	
Boat toll,	7,500	39,000
In favour of crossing at the head of Wells' Falls, yearly,		$16,500

It is true there will be a corresponding difference against the Delaware and Raritan canal, but this may be compensated in another way as will be presently shown. There is one more reason for making a connection at this place; the Delaware division of the Pennsylvania canal is now fed from the Delaware river by an expensive machinery which at a low time is not sufficient to supply water; some other mode of feeding will necessarily be resorted to, none can be so effective and cheap as a low dam across the river, which could be constructed without any injury to the river navigation, and at comparatively small expense, about one-third of the work being now completed such a dam would facilitate the crossing of boats, improve the landings at the villages above, and furnish an abundant supply of water for the canal, and if a lock were put in from the Pennsylvania canal to the river at the foot of the falls, it would satisfy every reasonable desire as to the river navigation. Pennsylvania may indeed as has been proposed, equalize her advantages by imposing the same toll on the produce that leaves her canal, which are charged upon that which passes through it, but this policy, however just, if carried far enough to answer the purpose in this case would be odious to the community interested, and whenever resorted to, would probably stimulate great exertion to avoid its effects, for which there are various means. First, A reduction of tolls on the Morris canal. Second, An extension of the Delaware and Raritan feeder up the river with a tow path on the Jersey side, where the water suited.—And Third, A resort to a larger class of river boats, which as there are no rapids of any magnitude between the head of the Delaware and Raritan feeder, and Easton, could with an improvement of the channel be used for a considerable part of the year with advantage. These facts show the danger of attempting a rigid countervailing policy and the greater value of any arrangement which would be reasonable and acceptable to the rival canal interest, as well as those who may be obliged to use them.

If Pennsylvania should attempt the countervailing system, all those of her own citizens who may be affected injuriously by it will continually struggle to have it abandoned, and when the trade of the North Branch of the Susquehanna, and the lake country, shall, as it certainly will, be brought down the Lehigh, the interests opposed to the system will embrace a great extent of territory and population.

It has already been strenuously urged upon the canal commissioners, and before the Pennsylvania Legislature, to make outlet locks at Black's Eddy, although it would cost Pennsylvania, exclusive of the locks, about forty or fifty thousand dollars to make a new feeder to supply the loss of water which these locks would occasion, while the whole expense of an outlet at the head of Wells', with an increased supply of water for the lower division of the canal, and lockage round the falls, would probably not cost half the sum necessary to make the feeder and locks at Black's Eddy, and the probable additional tolls on coal alone, received by Pennsylvania, would be, as shown above, upwards of sixteen thousand dollars a year. These additional tolls must be greatly increased whenever the North Branch trade shall be added, for this also will go wherever there may be the best market, which, before the opening of the ice on the Erie canal, will generally be in New York. The route from Ithica, in New York, by way of the Lehigh, will become, in fact, an earlier spring route for that fertile region to the New York market, with a choice of Philadelphia in its range: ten miles of tollage on the products and merchandise will be of no small consequence; but a satisfactory arrangement of a question affecting rival interests, and a complete avoidance of a countervailing struggle between neighboring States, is an object of perhaps even more importance.

The inhabitants of New Jersey bordering on the Delaware above Wells' falls, have been long in the habit of dealing alternately for produce and goods with New York and Philadelphia; and they are aware of the same practice on the Pennsylvania side of the river; it is important to both interests to have access to each canal without the expense of crossing the bridge or a ferry, which amounts to about one dollar per ton. They are aware that the use of lime is highly important to the lands in New Jersey, which would be increased to a great extent if the present expense of getting it over the river can be avoided, which is about three cents per bushel. If the lime were relieved from this charge, it could be taken to New Brunswick for about the same sum it now costs in Lambertsville, and there is little doubt but that ten thousand tons of it might be sold annually between Lambertsville and New Brunswick.—No other connection than that at the head of Wells' falls will answer this purpose, as all the convenient bodies of the best limestone on the Pennsylvania side, are within three or four miles of that place and above

it. The importance of this article to the agriculture of this part of New Jersey can scarcely be imagined, and the amount of tolls and value of the trade and transportation, as it were thus called, is well worthy of attention. It is improbable that even the New York market may be ere long supplied with a considerable portion of its lime through this channel, as by the use of coal for fuel, it can be afforded much cheaper than when it is burnt with wood. In that case one hundred thousand tons would not be an unreasonable estimate of the additional demand.

If the dam already commenced at the head of Wells' falls, be extended across the river and locks made into it, the expense will be the same to pass into the Delaware and Raritan canal at this place that it now is at Black's eddy, but if the Delaware and Raritan company make a corresponding connection it will reduce the expense on coal the amount paid for unloading, viz: ten cents per ton, and the Delaware and Raritan canal company will be more than compensated for the toll on the ten miles of their feeder by the introduction of the limestone from the adjacent quarries in Pennsylvania, which will pass a much greater distance on their canal. They also will be relieved from the unprofitable strife of counteraction and violent competition and every reasonable desire, as well of the State of Pennsylvania as of the Delaware and Raritan company, and of the people interested in transportation on these canals cannot fail to be satisfied.

From Poulson's American Daily Advertiser.

STATEMENT

Of the quantity of Rain which has fallen in each year, from 1810 *to* 1834, inclusive,—the first fourteen years by the guage of P. Legoux, at Spring Mill, and the following eleven years by that kept at the Pennsylvania Hospital:—

	inches.		inches.
1810	32,656	1823	41,815
1811	34,968	1824	38,740
1812	39,300	1025	29,570
1813	35,625	1826	35,140
1814	43,135	1827	38,500
1815	34,666	1828	37,970
1816	27,947	1829	41,850
1817	36,005	1830	45,070
1818	30,177	1831	43,940
1819	23,354	1832	39,870
1820	39,609	1833	48,550
1821	32,182	1834	34,240
1822	29,864		

The whole quantity which fell in the above 25 years was 914,743 inches, which gives an annual average of 36,589 inches.

The rain in each month of the year 1834, was as follows:—

	inches.		inches.
1st mo.	2,49	9th mo.	3,57
2d "	2,22	10th "	3,29
3d "	2,02	11th "	3,01
4th "	2,83	12th "	2,33
5th "	3,52		
6th "	3,99	Total,	34,24
7th "	4,35		
8th "	0,62		

Penn. Hospital, 1st mo. 1, 1835.

POTTSTOWN, Pa. Dec. 17, 1835.

Last Sunday night was the coldest weather we have had this season, and the Schuylkill navigation was suddenly closed. We heard the note of the boatman's horn that was wont to peal so merrily, on Saturday evening, but the music like that of Baron Munchausen's seemed frozen in the horn. On Monday morning the Schuylkill was completely frozen over.

From the Commercial Herald.

NEW TONNAGE.

The following statement exhibits the number as well as the class of vessels built at the Port of Philadelphia, for the last five years.

1830—2 Ships	553 68.95ths tons.	
2 Brigs	579 63	
8 Schooners	486 63	
14 Sloops	361.56	
3 Steam Boats	608.51	
		Total 2.590.6-95ths tons.
1831—5 Ships	1936.79-95ths.	
4 Brigs	859 20	
7 Schooners	392.39	
10 Sloops	336.23	
		Total 3.525.61-95ths.
1832—4 Ships	1733.42-95ths.	
2 Brigs	600.46	
3 Schooners	482 71	
11 Sloops	516.85	
1 Steam Boat	125.48	
		Total 3.159.7-95ths.
1833—8 Ships	3196.46 95ths.	
5 Brigs	644.51	
5 Schooners	351.50	
8 Sloops	410.10	
1 Steam Boat	314 29	
		Total 4.916.86-95ths.
1834—1 Ship	544.28-95ths.	
1 Barque	324.92	
3 Brigs	558 21	
3 Schooners	241.76	
10 Sloops	506.57	
1 Steam Boat	307.90	
		Total 2.483.79 95ths.

Mr. GUIER, the U. S. Weigher, has politely furnished us with the following information:

RAIL ROAD IRON.

Statement of the Imports of Rail Road Iron, into the District of Philadelphia in 1831, 1832, 1833, and 1834.

	cwt.	tons.	qr	lbs.
1833—Edge Rails and flat Bars	2214	9	2	21
Spikes and Splicing Plates	6	0	2	9
Total	2220	10	1	2
1831—Edge and flat Rails	4969	14	0	0
Iron Chairs for rails	1106	8	0	0
Pins Wedges and Splicing Plates	105	18	0	2
Tons	6182	0	0	2
1833—Edge and flat Rails	9149	9	1	19
Iron Chains for Rails	1428	13	0	0
Pins, Wedges and Splicing Plates	363	5	3	14
Tons	10941	8	1	5
1834—Edge and flat Rails	6412	10	0	0
Iron Chairs for Rails	1506	11	0	0
Pins, Wedges and Plates	445	8	0	0
Tons	8364	0	0	0
Rolled Iron exclusive of R. R. Iron	791	9	0	0
Pig Iron	694	8	0	0

We acknowledge ourselves indebted to Col. RILEY, for the following statement:

QUERCITRON BARK.

Return of the quantity of Quercitron Bark, Inspected at the Port of Philadelphia, during the years 1833 and 1834. Also, the quantity shipped during the same period, and the stock remaining on hand in store, on the 1st of January, 1832, '33, '34, '35.

	Inspected.			Shipped.		
	hhds.	tcs.	bbls.	hhds	tcs.	bbls.
1833—	3414	1	169	3535	1	26
1834—	3200	45	414	3434	14	76

	hhds.	tcs.	bbls.
In store Jan. 1st 1832	1424	0	77
" " 1833	675	1	64
" " 1834	554	1	7
" " 1835	320	32	45

JOSEPH S. RILEY, Inspector.

FLOUR.

During the year 1833 there was exported to Foreign places from the Port of Philadelphia, 127,219 bbls. of Flour.

From the 1st January, 1834, to the 30th September, inclusive, the Foreigh Exports amounted to 64,845 bbls.

CORN.

During the year 1833 the Foreign Exports of Corn from this port were 66,808 bushels.

During the three first quarters of 1834, the amount was 33,263 bushels.

INSPECTION OF SALTED PROVISIONS.

Inspected from January 1st 1834, to Dec. 31st inclusive, at the Port of Philadelphia—

BEEF····2,792 bbls.	PORK····7,026 bbls.
525 half do.	16 half do.

From the National Gazette.

GEOGRAPHICAL ESTABLISHMENT.

We have recently had an opportunity of inspecting the Map Publication Establishment of Mr. H. S. Tanner, situated in the four story building at the northwest corner of Chesnut and Sixth streets, in this city, It occupies the first, second and third floors of that extensive range known as the Shakspeare Buildings, which extends about eighty feet along Sixth street, fronting on Chesnut street, and immediately adjoining the Theatre. The exterior of the buildings, having recently been subjected to a thorough repair, presents quite an imposing appearance when viewed in connection with the public offices in the vicinity.

The principal entrance is on Sixth street, by a large doorway which opens upon a staircase leading to the Depository of the Establishment, on the north end of the first floor. In this apartment, which is very extensive and appropriately fitted for its object, the various maps and other works prepared and published by Mr. Tanner, are arranged in geographical order, by which a reference to any map may be had with the utmost facility. Here also the commercial business of the concern is conducted, and the finished maps exposed to sale or prepared for exportation and supply of orders from abroad, which are numerous and constantly augmenting. An idea of the amount of business transacted in this establishment may be conceived from the fact that nearly six thousand copies of the large Map of the United States, alone, have been disposed of since it was first issued, together with a large number of the other maps enumerated in the catalogue, which including other recent publications, comprehends upwards of two hundred maps of various descriptions, some being six, and several of them four sheet maps. The estimated cost of the engraving alone of this immense collection of copperplates, we are informed, exceeds one hundred thousand dollars.

On the same floor with, and immediately adjoining the Depository, is the "Drawing Room," so called, where most of the drafting, projecting and other preliminary operations connected with the construction of maps, are carried on. All the apparatus and appliances pertaining to this department are of the most perfect description. The number and value of the foreign and domestic maps and other works of reference with which it is supplied, afford the means of rectifying whatever errors may have been committed in the engraving or otherwise. By the aid of these and an extensive correspondence with every part of the United States, the maps issued from this establishment seldom fail to exhibit the most recent information regarding the countries delineated by them. In the extensive collection of geographical works composing the library, are several atlasses and maps, which have been presented to Mr. Tanner by some of the learned societies and scientific individuals of Europe. Among these we noticed a Universal Atlas consisting of six folio volumes, containing upwards of four hundred imperial sheet maps; a map of Europe, comprehended in one hundred and sixty-four large sheets; an eight sheet map of Sweden, presented by the Academy of Science of Stockholm, through Professor Berselins; together with many valuable works from Vandermaelen of Brussels; from Professor Berghaus of Berlin; from the Geographical Society of Paris, the Royal Geographical Society of London, &c., forming altogether one of the most complete and extensive collections of geographical works in this country.

From the Library we passed into the engraving room, also on the first floor and fronting on Chesnut street. It is a large and commodious apartment, suitably furnished, and having five windows, each occupied by an engraver. These, in conjunction with several other engravers, not permanently attached to the establishment, execute the engraving. The process of map engraving, as practised here, differs essentially from the ordinary method. Instead of finished paper drawings, which were uniformly used not long since, the projections or lines of latitude and longitude, are drawn directly upon the copperplate, which is thus prepared for the insertion of the topographical details consisting of the natural features of the country about to be delineated; these being adjusted in conformity to the geographical points previously fixed, are followed by the location of the cities, towns, roads, boundaries, &c. All this is effected by a small steel point, resembling a sewing needle, inserted in a wooden or ivory handle; which bears the same relation to, and performs the same office upon the copperplate, as does the lead pencil to the paper, by the old method. All the leading parts constituting the representation of both the civil divisions and physical features of the country, having been thus transferred to the plate, it passes into the hands of the engraver, by whom the "plan work," so called, is cut by a small steel instrument termed the graver. When the plan work, (which includes nearly all the work, except the shading of the mountains, water, and the lettering,) is engraved, the names of the larger districts are inserted, then the names of towns, rivers, mountains, &c., and the whole completed by shading the water, mountains, marshes, &c. The engraving department is divided iuto various branches, each of which is assigned to a different individual, who rarely undertakes any thing belonging to another branch—thus for example: the projections of all maps executed here, and the adjustment of the leading geographical points, are calculated aud fixed by the proprietor of the establishment, under whose immediate direction the drawings are made by one of his assistants.

The plates are then transferred to a third person,

who engraves the plan work, then to others who successively execute the lettering, the shading of the water and mountains, and the last completes the map by inserting the title and embellishments. We observed several maps in the various stages of engraving. One was shown us which had been just commenced; It presented to our view little else than a confused mass of reticulated lines and figures, apparently without form or feature; this, we were told, was an embryo map of Venezuela and New Grenada, intended for Mr. Tanner's New Universal Atlas, now nearly completed.

This branch of the establishment is highly interesting, and deserves the particular notice of all visiters. Ascending the stairway leading to the second floor of the building, we entered the printing office, an extensive range of apartments situated in the rear of, and adjoining the coloring room, which we shall describe presently. These rooms contain three or four large copper-plate presses, which are kept in a constant state of activity, and are capable of throwing off from five hundred to seven hundred impressions per day. As this may appear to persons who are only familiar with the common letter printing, to be a small number, we shall notice, briefly, the process of copper-plate printing as witnessed by us. The copper-plate press differs altogether from that used in printing from metal types. It is composed of two planks placed vertically, and (in the larger presses) about two feet apart. These planks are joined by a substantial frame work, having a small roller at each end, on which a stout moveable plank traverses horizontally.

In the centre of the frame and equi-distant from the transversing rollers, are placed two larger rollers one above the other, but not in immediate contact. Between these rollers, the plank just mentioned, which corresponds in width with the length of the two principal rollers, is inserted. By the aid of cross bars placed on one side of the machine, the upper roller is made to revolve, and by this means the horizontal plank and lower roller are put in motion by which the impression from the plate is obtained. The upper roller has its entire surface coated with soft woolen cloth, which serves the double purpose of equalizing the pressure and of forcing the paper into contact with the ink, which is previously rubbed into the engraved parts of the plate. This is the most delicate part of the process. It is done, at present, by a hand roller, which has been substituted in place of the "ink ball," formerly in use. Upon the surface of this roller the ink is uniformly spread, and then rolled over the engraved surface of the copper-plate until it is completely covered: the ink is then pressed into the engraved lines, when that portion of it which remains on the surface is entirely removed from the plate which is then prepared for the press. The plate being thus made ready, is placed on the moveable plank, above mentioned, with its engraved face upward; the paper, which is previously wet for the purpose, is placed upon the plate and the whole is then put in motion, by turning the cross-bar. By this operation, the plate passes under the roller to the opposite side, when the paper is removed, having in its transit, received the ink that was contained in the engraved portions of the plate so nicely distributed as to present an exact image in reverse of its metalic original. About five minutes are consumed in printing a map of the size of the paper used for this Gazette.

From the printing office we passed into the coloring rooms on the same floor. These are very extensive and in every respect appear to be well adapted for the purpose to which they are devoted. They are occupied excusively by respectably attired females by whom the the maps are colored. The neatness and order, apparent throughout this branch of the establishment, cannot fail to strike every beholder. To facilitate the process of coloring, the maps are printed upon highly sized paper, which is afterwards tested by passing a damp sponge over the face of each, when if any defects in the sizing exists, they instantly appear in small spots of a circular form. By this operation, a useless waste of time and materials in the vain attempt to color such maps is thus avoided. This simple contrivance may afford a useful practical hint to young artists and amateurs in water color drawing.

Liquid colors are employed altogether in this branch of colouring. It consists of three varieties, viz: "washing," "shading," and "lining," sometimes called "narrow lining." By the first mode, the color is spread over the entire surface of a portion of the map, with a large camel's hair brush; much practice is required to produce a uniform tint in all its parts which constitutes the chief beauty of this style of coloring.—The second variety (shading) is commenced with a brush similar to that used in the foregoing method; and completed by the application of a wet sponge, resembling, in form, a port crayon; with this are produced those nice graduations of tints from the strongest to those almost imperceptible shades which serve, not only to mark the sub-divisions, but also to beautify, a map. These modes of coloring are almost peculiar to this country. With the exception of some English maps of a recent date, nearly all European maps, with which we are acquainted, are colored by a single faint line extending along the engraved boundaries. This mode, which Tanner prefers over all others, and which he has endeavored to introduce into more general use, here; serves every useful purpose for which coloring is designed; and is free from the objection which is justly urged against the others, from their liability to impair in some measure, that clearness in the engraving, which is so desirable. The public taste, however, was found to be decidedly in favor of full coloring, and in consequence, the lining system is scarcely ever employed except in delineating canals, rail roads, &c. Among the various mechanical employments in which young females are engaged, there are few more attractive or beneficial in every point of view, than that of map coloring. This appears to be well understood, as applications for admission of young ladies, who desire to acquire a knowledge of the art, have always been numerous, and, of late, have become still more so. In addition to the pecuniary compensation (from three to five dollars a week, each,) received by the colorers, they have the opportunity of acquiring an extensive acquaintance with general geography, which the daily inspection of maps cannot fail to impress upon their minds.

Highly gratified by our examination of this branch of the concern, we repaired to the Bindery, a spacious room on the third floor of the building, where the portable and dissected maps are prepared. The portable maps are cut into small sections of the required dimensions, (generally about 3 to 4 inches,) which are pasted on thin muslin, sufficiently apart from each other to allow the map to fold. Great attention is necessary in placing the sections on the canvass, to prevent injury to the map, which would inevitably result from an irregular arrangement of the several parts. The proportion of maps required in this way, is as one to twelve on rollers and varnished.

Maps printed on Bank-note or silk paper for the use of travellers, are also prepared in this branch of the establishment. Large quantities of these Maps are sold here and sent off in every direction.

Immediately in front of the bindery is an extensive apartment occupied by persons employed in mounting maps. Every part of this business is performed by females. The process of mounting is commenced by stretching a sheet of canvass over a square frame, on which the several sheets composing the map (previously coloured) are joined and pasted. When sufficiently dry, two or three coats of transparent size are applied, intended to produce a uniform surface and to prevent the varnish (which is subsequently spread over its face)

from sinking into the paper. When the varnish is thoroughly dry which is usually the case in two or three days, according to the state of the weather, the maps is cut from the frame, bound on two of its edges, nailed upon rollers, and thus prepared it is ready for use.

Last week, we paid a visit to the extensive location of the business of Mr. H. S. Tanner, the eminent geographer. We were so much struck with the variety and value of his arrangement, that we asked for copious memoranda of the particulars, and embodied in the form of an editorial article, which is placed in the second page.

We have entered into details with regard to the several branches of this important establishment, under an impression that such an account would prove acceptable to those of our readers, who have never had an opportunity of inspecting processes which are comparatively new in this country. The map business in the United States is of recent origin. Twenty years since there was scacely a Map published here. Even maps relating to our own country were imported from Europe for the supply of our libraries and schools. Now the case is essentially altered. American maps are exported not only to England and Europe generally, but also to every other part of the civilized world Very few comparatively, are now imported from foreign countries, and we feel justified by our late gratifying examinations, in saying, that every process, both scientific and mechanical, employed in the formation of maps, has reached such a state of maturity in the United States, as to render us completely independent on foreign countries for a supply of this indispensable article.—*Nat. Gaz.*

DRY GOODS DEALERS.

Agreeably to a call made by the committee of dry good dealers, in favor of the present system of measurement, a public meeting was held at the Exchange, MATTHEW NEWKIRK in the Chair, and R. D. Wood as Secretary.

The chairman briefly stated to the meeting the course pursued by the committee appointed at the public meeting held on the 30th ultimo, when, on motion, it was

Resolved, That the report be accepted and approved.

The resolutions adopted by a meeting of importers, commission merchants, and auctioneers, was received from their Chairman and Secretary, and laid before the meeting; when, on motion, it was

Resolved, That a committee of fifteen be appointed to co-operate with the committee of importers, commission merchants, and auctioneers, who signed the pledge (to take effect the first inst,) in an application to Congress to establish a uniform standard of weights and measures, and to take such other means for the attainment of that end as they may deem expedient.

Resolved, That the committee appointed by the public meeting of the 30th be continued with power to fill vacancies.

Resolved, That the proceedings of this meeting be published in the papers of this city.

MATTHEW NEWKIRK, Chairman.

R. D. Wood, Sec'ry.

The Wheeling Times, says:—"Travellers between this place and Philadelphia, will be pleased to learn that the proprietors of the People's Line Stage Company have made arrangements for conveying passengers from Wheeling to Philadelphia, by way of Bedford and the Columbia rail road, in the short time of 60 hours and at the very low fare of $12.

DELAWARE BREAKWATER.

EXTRACTS FROM THE REPORT OF THE WAR DEPARTMENT.

The present condition of the work at the Delaware breakwater is shown in the report of the Quartermaster General, and in that of the commission lately instituted by your orders to examine it. It has been known for some time that gradual depositions were making in the vicinity of this work, by which the depth of water was somewhat reduced. But, until this season, the process was so slow and uncertain, that no anxiety was felt with respect to its final effect upon this great national improvement. Recently, however, the accumulation of sand in the artificial harbor has been much more rapid, and indicated the necessity of a thorough examination by scientific persons, in order to ascertain, if possible, the causes of this occurrence, and to check or obviate them. The views of the officers selected for this purpose will be found in their report; and, agreeably to your directions, they have been adopted by the department. An estimate for one hundred thousand dollars, to be applied to this work, is among the annual estimates of the department, and if approved by Congress, that sum will be appropriated in the manner pointed out by the report, to the completion of that part of the work already begun, and yet unfinished. In the mean time, by a series of observations, frequently and carefully taken, the probable operation of the tides and currents may be ascertained, and the best remedy to counteract them pointed out.

A.

LEWES, Del., Nov. 10, 1834.

Hon. LEWIS CASS,

Secretary of War, Washington:

SIR: In compliance with the instructions of your letter of October 25th, we have made an examination of the Delaware breakwater, and now present the following report thereon:

It appears, by an inspection of the maps representing the state of the works at the close of operations of each year, that, since 1830, every year has presented new additions to a shoal near the west end of the breakwater, and that within the last year, particularly, this shoal has greatly increased.

Before 1833 little had been done on the ice-breaker; since that period this work has been brought nearly to completion, and a shoal on either side of this mass has been observed to be simultaneously forming.

These are the principal facts bearing upon the question before us; and, after a deliberate consideration of them, we unanimously concur in the following opinions, viz.

That the next year's operations should be confined to giving to all the work already begun the ultimate dimensions, omitting any further extension of the work eastward, and waiting during the year, and, if necessary, for a longer period, the further growth of the shoal.

That, in the mean time, very numerous and careful observations should be made to determine the precise amount of enlargement, both in lateral limits and in elevation, of all the shoals.

That a system of observations should be steadily pursued, whereby the force and direction of the flood and ebb currents, at different times of tide, and at different distances from the works, may be accurately given, and clearly represented on the map.

With the extension of the work above water, herein contemplated, the immediate advantage will be obtained of a considerable augmentation of sheltered space; the same extension will serve to indicate, in a more decided manner, the form and magnitude which the shoals may be expected ultimately to attain; it will bring nearer to a solution the important question as to the most proper width to be given to the eastern entrance

to the harbor. And with the aid of the information obtained by the observations on the shoals and on the tides, an opinion less liable to error may be formed as to the exact cause of the shoals, the extent to which they may reach, and, if remedy or correction be possible, the mode and manner of remedy or correction.

Sooner than herein contemplated we believe it would be premature to resolve on any other change than that indicated of the original project, as we believe it would also be premature now to fix upon the matters of detail in the style or manner of the ultimate finish.

We have the honor to be,
Very respedtfuily,
Your most obedient servants,
TH. S. JESUP,
Major General and Quartermaster General.
JOS. F. TOTTEN,
Lieutenant Colonel of Engineers and Brevet Colonel.
S. THAYER,
Brevet Lieutenant Colonel.

—

Presque Isle Harbor, Pennsylvania.—The depth of water at the entrance is the same as last year, twelve feet, and from thence to the borough piers nine and a half feet at its shoalest place. The borough piers are now made convenient for boats to lay alongside, land their passengers, discharge their loading, and take in wood, and are found more convenient than the United States works. The inlet across the Presque Isle near the west end of the harbor presents no appearance of any change since the survey was taken on the first of August, and communicated to the department on the 12th of the same. No sensible effect has since been produced by this inlet on the eastern entrance of the harbor. The effects of the currents and counter-currents on the sand on which the piers are placed render any estimates that can be made for completing them uncertain. The currents, which are constantly setting in or out of the harbor at the rate of from two to three miles an hour, and frequently changing every hour, have a powerful effect in removing the sand. In my annual report, I submitted the estimates for closing the breach at the junction of the south breakwater and pier. The quantity of stone then estimated for the object being five hundred cords, double the quantity of stone than then estimated will be required. Eight hundred cords have already been placed in the breach, and two hundred cords more, according to calculation, will be required, making, in the whole, one thousand cords. The stone have been thrown in on a line with the piles, and suffered to roll down and graduate themselves. At the extremity of the bar there is now thirty feet of water. In many other places deep basins have been worn, and will swallow up more stone than was calculated. Other places alongside of the breakwater have filled up with sand, where there was a depth of from six to eight feet, and a breach formed for several rods. The breach in other places has disappeared, and a basin formed six to eight feet deep; these changes have taken place in several instances within the last two years. What will be the effects of placing stone on each side of the piers and breakwater, time alone can determine. I am of opinion that this is the only method that can be adopted to give strength and permanency to the work: furthermore, as fast as the stone within the piers or breakwater, or on the outside, settle, to bring them up to their proper height by adding more, and continuing the supply until a firm base is secured. When this important end is gained, and a superstructure of solid mason work executed the whole length of the piers and breakwaters, the work may be considered complete; when the constant watchfulness and repairs which they now require, may, in a great measure, be dispensed with.

From calculation, 1,000 cords of stone, in addition to the estimates of 1833, will be required for 1835, amounting, with the contingencies, to $5,000; this sum, with the balance now remaining, will be sufficient for all expenditures previous to commencing the mason work.

Two valuable quarries of stone, which promises a large supply for constructing these works, have been opened this season on the margin of the lake, within one mile of the piers. The stone can be taken by scows direct to the works without the expense of carting. The stratum has a smooth surface of equal thickness; is from 18 to 20 inches thick, and can be easily wrought to any length or breadth required. Stone of this description, and so conveniently situated, will greatly facilitate the operation of the mason work.

An estimate of the stone, lime, and mason work required for the top of the piers and breakwaters, commencing at low water mark, at the harbor of Presque Isle.

South breakwater 3,450 feet in length, 8 feet by 3 in length,	58,800 cub. ft.	
North breakwater, 3,000 feet in length, 8 feet by 3 in length,	72,000	
South pier, 800 feet in length, 14 feet by 4 in length,	44,800	
North pier, 1,250 ft. in length, 14 ft. by 5 in length,	87,500	
	263,100	
Estimated at 12½ cts. per c. ft. delivered at the works		$32,887 50
All the stone to be large, none less than half a ton.		
Coping for breakwaters to be 8 feet in length, and for piers 7 feet: 1 barrel of water lime every 128 cubic feet of wall is 2,055½, at $2 per barrel		4,111 00
Laying 263,100 feet of masonry, at 6 cents the cubic foot, furnishing their own sand,		15,786 00
Superintending, say		2,000 00
Taking down old piers level with the water,		1,000 00
Add 10 per cent. for contingencies,		5,578 49
		$61,362 95

DIVIDENDS FOR THE LAST SIX MONTHS.

American Insurance Company,	5 per cent.
Bank United States,	3½ "
Pennsylvania Life Insurance Co.	3 "
Lehigh Coal Company,	3½ "
Union Insurance Co.	5 "
S. Permanent Bridge,	4 "
Bank North America,	3 "
Delaware and Raritan Canal and Camden and Amboy Rail Road Co.	3 "
Cumberland Bank, (N. J.)	3 "
Atlantic Insurance Co.	5 "
Marine Insurance Co.	5 "
Fire Insurance Co. of Philadelphia,	3 "
Philadelphia Savings Institution,	3½ "

Trenton Banking Co. $1 20 on each share.—*U. S. Gazette.*

FIRST SEMI-ANNUAL REPORT.

PHILADELPHIA SAVINGS INSTITUTION, Jan. 5, 1835.

In compliance with the charter, the undersigned, appointed a committee by the Directors thereof, to make and publish a statement of the affairs of the said institution, met for that purpose at the office, on the third instant.

We proceeded to examine the several statements of the office, and to compare them minutely and carefully with the entries on the books, the vouchers of payment, and disbursements and the amount of cash on hand. It gives us pleasure to state, that we find the whole to correspond with the statements submitted to us with

perfect accuracy, and to exhibit a very satisfactory result of the operations of the last six months.

The committee submit the following statement, as the result of their examination.

The Philadelphia Savings Institution in account current.

DR.

To capital stock paid in,	$59,090, 00
"amount received from special, weekly and transient depositors,	114,929, 03
"interest on loans,	4,614 87
"unclaimed dividends,	292 50
	$178,926 40

CR.

By cash on hand,	$8,308 52
"loans on real estate stock, and other securities,	169,190 28
"expenses for six months,	1,427 60
	$178,926 40

GEORGE W. SOUTH.
CHARLES ROBB.
CHAS. BARRINGTON, Jr.
J. P. NORRIS, Jr.
MORGAN ASH.

We find in the Harrisburg Chronicle the following letter, which sets forth a good degree of enterprize.

Extract of a letter, dated

HOLIDAYSBURG, Dec. 22, 1834.

Would you believe it? A canal packet boat arrived at this port a few days since, from Utica, on the Erie canal, in the state of New York. She did not come round by the Hudson, or the Raritan, or by the Jersey canal, or the Delaware, nor by the Schuylkill and Union canals. No! but by a route not thought of every day by the best of our improvement men. She departed from Utica for Montezuma on the Erie canal, thence by the Seneca canal to Geneva on Seneca lake, thence from the lake to Elmira at the head of the Chemung canal, thence by the Chemung canal to the Chemung river, thence down that river to the North Branch of the Susquehanna, thence down the North Branch to the pool of Nanticoke—thence by the Pennsylvania canal to the mouth of the Juniata canal to Hollidaysburg, having thus traversed by water a distance of about four hundred and eighty miles.

The packet is constructed on a new model for canal boats, being composed of two hulls formed in the shape of long narrow batteaux, upon which the cabin is built. She is to run during the next season between Harrisburg and Columbia. Her owner is Mr. Doolittle, an enterprising Yorker, who is engaged at this, and at Johnstown, in building the packet boats which are to form the new passenger line that is to commence running next spring, between Pittsburg and Columbia

From Nanticoke to the Chemung river it is about one hundred and five miles, and thence to the mouth of the Chemung canal it is twenty miles; of this distance about one hundred and five miles are in the state of Pennsylvania. If the North Branch canal should be continued to the Chemung at Tioga Point, and thence by that river to the Chemung canal, by slackwater, which is said to be very practicable, we would have free communication with the interior of the great Empire State; thereby opening an extensive market to the black diamonds of the Lackawana, and iron of the mountain regions of the Juniata.

I am not, however, in favour of any extension of our canal system at present, with the exception of the cross cut to the Ohio canal, which ought to be made by all means. These hints are only thrown out for the consideration of those who may be disposed to take up the subject at some future and more auspicious period.

Respectfully, &c.

THE WEATHER.

Severe Night.—We learn from the New York Times that the passengers who left this city on Monday morning for New York by the Camden and Amboy Rail Road, reached Burlington at about 11 A. M., and there took the cars. At 6 P. M. they were about four miles from Amboy, and in one of those deep cuttings, were the ground ascends, they were at last brought up by a monstrous snow drift, which arrested all further progress. No effort availed to force the cars over the obstacle, though they backed repeatedly to such a distance as to acquire their fullest momentum. The passengers, many of them ladies, had been without food since leaving Philadelphia, and now with this tremendous storm of snow drifting with the howling wind, had the prospect of passing the piercingly cold night in the cars. It was proposed that some of the party should proceed on foot to Amboy, and procure means for bringing on the rest, but the four miles, through unbroken snow drifts, with the falling snow driving so furiously in their faces, seemed too hard a walk, and it was given up. Fifteen or twenty of the passengers then started, about 10 o'clock, to walk back about a mile, to a little house which they had passed, where they sat up all night, but with the comforts of fire and shelter. When they had departed, six or seven of those who remained, seeing the sad condition of their fellow passengers, and especially the ladies, set out on foot for Amboy, and after unparalleled fatigue and suffering, reached three in about three hours and a half. They were able to procure two sleighs, which were sent to bring on the ladies of the party. They arrived at the beleaguered cars about five o'clock in the morning, and took off the unfortunate females, who were nearly exhausted. By day-break the people of the neighbourhood were aroused, and gathering in with their sleighs, the whole party were transported to Amboy, and got aboard the boat between eight and nine in the morning. The boat took the outward passage to avoid the ice on the channel between Staten Island and New Jersey, and reached New York about 2 P. M. on Tuesday.

SNOW.—It commenced snowing about 9 o'clock on Sunday evening, and continued without much intermission until 9 o'clock on Monday evening, though the quantity of snow fallen is not large, say 8 or ten inches. The weather cleared up after twelve o'clock, but on yesterday morning about six, the sky again became obscured, and gave every indication of a fall of rain.—*Germantown Tel.*

HAMBURG.

SNOW about one foot deep now cover our streets, and it is still snowing. The sleigh bells' "merry jingle" greet our ears from all quarters.

MILTON, Jan. 3.

We had a great fall of snow on Monday last. It now lies in this vicinity of an average depth, from fifteen inches to two feet.—Sleighing good.—*Miltonian.*

THE WEATHER.—PHILADELPHIA.

A gentleman called in yesterday to say that he had just returned from the nothern part of Chester County, where, on Sunday morning, at ¼ before 8 oclock, the Mercury in the Thermometer stood at 10° below Zero, and on Monday morning at the same time, it was 12° below Zero.—*U. S. Gaz.*

From the Philadelphia Gazette.

THE WEATHER.

The severity of the weather, within the last three days, has never been exceeded at any time in this city,

within our recollection, although there may have been a single colder day

Saturday the 3d Inst. was a severe day, but there was not ice enough in the Delaware to stop the navigation, and the steamboats departed in the morning as usual. Towards evening it became colder, and at 11 at night, the thermometer, under a piazza exposed to the south, in a central part of the city, had fallen to 13. The Delaware, opposite the city, was frozen over during the night.

On Sunday morning, at 20 minutes before 8, which was about a quarter of an hour after sunrise, the same thermometer was at 4½. At 10 A. M. it rose to 13, and at half past 1 P. M. it stood at 32, the freezing point.

At 5 o'clock it had fallen to			12
At 7	"	it was at	12
At 9	"	at	11
At 10	"	at	10

And this morning at 20 minutes before 8 o'clock, it was down to 3 degrees above zero. The navigation will now probably be closed until the month of February.

At the Exchange, with a Northern exposure, the thermometer was

At 7 A. M. on Sunday, at	3
At 7 A. M. this day, (Monday)	2

The ice on the Delaware is strong enough to bear horses and sledges.

Since writing the foregoing, a friend who resides in Chesnut, below Thirteenth street, has stepped into our office, and given us the following statement of the thermometer at his house with a Northern exposure.

Sunday—6 A. M.		2 degrees below zero.
	9 "	zero.
	1 P. M.	10 above zero.
Monday—6 A. M.		4 below zero.
	9 "	zero.

From another source in Walnut street above 12th, we learn that the mercury this morning was at 2 below zero, at 6 o'clock, with a Northern exposure.

We should be glad to receive from some inhabitant of Southwark, a statement of the weather in that quarter during the last two days.

THE WEATHER AGAIN.

The following statement is furnished by a gentleman residing near the corner of Walnut and 9th streets, the thermometer having a N. E. direction

Jan. 3—8 P. M.	28 above zero.
" 4—7 A. M.	zero.
" " 2 P. M:	14 above.
" "—8 P. M.	10 "
" 5—7 A. M.	1 below.—*Ib.*

THE WEATHER.—The cold continues to be intense. The thermometer was yesterday at 4 P. M. at 28°, at 6 P. M. at 23°, and at 11 P. M. at 13°. This morning 7 o'clock it was as low as 6°, and at 9 had only risen to 7°. We doubt if so long a series of cold days, is within the recollection of any of our citizens of middle age.—*Ib. Jan.* 7.

A remarkable change took place in the weather on Sunday. Saturday was comparatively mild for the season, as were also several preceding days. Not a particle of ice was to be seen, when on Sunday morning the wind got to the N. West, and blew with great violence, accompanied by a degree of coldness, which made it freeze in the shade during the whole day. Our thermometer at 1 P. M in a warm piazza, exposed to the South, was at 42, at 6 at 22, at 9 o'clock at 14, and yesterday morning at half past 6 o'clock it was but 9 degrees above zero, As we saw it with our own eyes, we can vouch for the fact. If our recollection serves, there was not so cold a night during the whole of the last winter. The Schuylkill is frozen over, but there is no ice in the Delaware opposite the city.—*Ib.*

JAN. 7.

THE WEATHER.—Within the last twenty-four hours there has been a great change in the weather. The thermometer, which stood yesterday at 1-4 before 7 o'clock, at 3° above zero, was this morning at the same hour at 20° above. The wind since an early hour this morning, has been blowing hard from a north easterly direction, but is now clear. The thermometer on which our personal observations are made, was at 6 P. M. yesterday, (Monday) and at 20, and at 10, P. M. at 17, which we mention to keep up the chain of the last three days.—*Com. Herald.*

The state of the thermometer in West Chester, on Sunday last, at sun rise, was 2 degrees below zero, Monday at sun rise 3½.

THE ICE BOAT.—On Saturday we noticed the arrival of this boat from New York, built by the Camden and Amboy Rail Road Company, and intended to ply between this city and Camden, during the obstruction of the river Delaware. Yesterday we witnessed the trial of her powers and if we are to judge from this first attempt, we should say she was fully competent for the performance of the objects of her construction. The ice was about three inches thick, yet she forced her way through it without much difficulty, to the entire satisfaction of hundreds who had assembled on the wharves to witness her first performance.—*Commercial Herald.*

We are informed that the new steam ferry boat of the Camden and Amboy Rail Road Company, left Market street wharf, this morning, at 2 minutes past 8 o'clock, for Camden, with the passengers for New York, and the train of cars left Camden, at 25 minutes past 8, making the time in crossing, the boat having to cut her way through the ice, and starting the cars 33 minutes.

DELAWARE AND RARITAN CANAL.

Lime and Limestone.—Since the opening of this work in July last, 97 vessels entered the locks at Bordentown, laden with the following amount of lime and limestone, nearly all of which came from the quarries and limekilns on the Schuylkill, Pennsylvania, 3,569,722 lbs., lime, equal to 491,21 bushels, of which 181,100 lbs. went to New York; the balance went to landings on the canal, mostly for agricultural purposes; and 4,357,288 lbs. of limestone, all of which was landed at different places upon the canal for different purposes. The last named article would, when made into lime, make the total quantity brought from Pennsylvania, for the supply of that market alone, equal 75,000 bushels.—*Inq.*

THE REGISTER.

PHILADELPHIA, JANUARY 10, 1835.

By the numerous extracts inserted this week it will be seen that for the last week or ten days, there has been an unusually severe spell of cold weather. The Delaware is now crossed upon the ice with horses and sleighs—and the ice is said to be one foot thick.

We expected to furnish the Index this week, but owing to some disappointments it will not be published till next week—although it is now nearly all in type.

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